

1.932
A2C42
Cp

CA-18
June 1951

FROZEN CONCENTRATED APPLE JUICE

Chemical Engineering and Development Division
Eastern Regional Research Laboratory
Philadelphia 18, Pennsylvania

At a meeting of the American Chemical Society in Philadelphia on January 18, 1951, a process was described for preparing a full-flavor frozen concentrated apple juice, and cost figures were given. A manuscript describing this work will be published in the near future. However, in the meantime, so many inquiries have been received regarding frozen concentrated apple juice and the cost of its manufacture that the following information is made available.

The process consists in preparing apple juice in the conventional way and then stripping the aroma from it to produce a volatile fruit concentrate or essence.* The basic principles of essence recovery were described by Milleville and Eskew in Western Cammer and Packer, October 1946. Improvements in design have been made since then; further information can be obtained from this Laboratory. The stripped juice, now pasteurized by the heat incident to essence recovery, is then concentrated to 45° Brix under a vacuum of 26 inches of mercury or higher. The previously recovered aroma is then added to the concentrate, and the product is frozen and packaged in 6-ounce cans. The concentrate, which will be 44° Brix because of the added essence, can be diluted with three volumes of water to give a beverage possessing the taste and aroma of freshly made juice. It is completely free of the pasteurized flavor characterizing single-strength bottled or canned juice.

Cost estimates have shown that an apple-processing plant producing 417 gallons of juice an hour (that is, about one-half million gallons per year) could be converted to a frozen-concentrate plant with a capital investment of about \$207,000. The "cost to make" would be about 5.5 cents per 6-ounce can. This figure includes not only the production and packaging costs but all items such as administration, general expense and interest on investment and working capital. It does not include, however, the costs of the juice, transportation, distribution, or selling the product.

The cost of cartons and cans for the concentrate would be only about 41% of that for the cartons and bottles required to package the equivalent amount of single-strength juice. The saving in freight and packaging costs over bottled single-strength juice would compensate for more than 82% of the "cost to make."

The sample of frozen concentrated juice which you may have tested by this time was made last November by this process from a blend in equal proportions of McIntosh, Jonathan, Red Delicious, Stayman Winesap and Baldwin apple juice.

Storage tests have shown that the product will keep in a frozen state for upwards of one year without any detectable deterioration.

* Code of Federal Regulations, 1949 edition: Title 26. Internal Revenue. Chapter I, Sub-chapter C, Miscellaneous Excise Taxes, part 198, Volatile Fruit Concentrates.

